Popularity-driven science journalism and climate change: A critical discourse analysis of the unsaid

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A B S T R A C T

This study traces popularity-driven coverage of climate change in *New Scientist* with the special aim of identifying which aspects of the issue have been backgrounded. Unlike institutional communication or quality press coverage of climate change, commercial science journalism has received less attention with respect to how it frames the crisis. Assuming that the construction of newsworthiness in popular science journalism requires eliminating, or at least obscuring, some alienating information, the study identifies prevalent frames, news values and discursive strategies in the outlet's most-read online articles on climate change (2013–2015). With the official statement of the World Meteorological Organization (2014) as a reference, it considers which dimensions of the coverage have been backgrounded, and illustrates how language is recruited to de-emphasize some representations through implicitness, underspecification, or syntactic and compositional devices. It finds that the coverage relies on threat frames, privileges novelty and the timeliness and impact of climate science, avoids responsibility and adaptation frames, and endorses the so-called progress narrative. It discusses how this may forestall social and personal mobilization by placing trust in science institutions and technologies to confront the crisis.

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1. Introduction

The challenges for environmental journalism, particularly those of such a complex and multidisciplinary issue as climate change, are enormous. Not only does such coverage involve meaningfully translating the current scientific knowledge on climate phenomena to lay publics, but it should also mobilize these diverse publics to confront what Revkin (2014) sees as the biggest challenge to our planet since the threat of nuclear war. Although scientific knowledge is transient and subject to constant revision, journalism is expected to offer some certitude about prominent risks within the social realm (Beck, 2009). Climate change discourse in popular science journalism (CCD henceforth)[1] is regarded as a constellation of representations of climate science and climate policy debates that are relative to external critical moments (Carvalho & Burgess, 2005) and internal media production practices (Davis, 2007). However, science popularizers, notwithstanding their capacity to foster public

understanding of science, are constrained by framing conventions and argumentative positionings that reflect editorial lines and market forces (Bucchi, 1998; Nisbet, 2009). CCD is thus seen here as a result of the filtering of scientific knowledge through commercial interests and newsworthiness agendas of media outlets.

It is assumed that newsworthiness priorities in popular journalism lead to constructing CCD as resonant with target readers' attitudes and beliefs, perhaps by displacing alienating information, and bringing in elements of entertainment (Nelkin, 1995). If highly and globally circulated science popularizers (e.g., *New Scientist* – NS henceforth) are primarily devoted to attracting and cultivating audiences,[2] the question arises whether CCD is represented in ways that can possibly mobilize the public to reconsider their current lifestyle habits, consumer choices and political affiliations. Therefore, this study is devoted to capturing "the unsaid" – a result of a discursive strategy of making information less accessible in a selection of most-read articles listed on NS's website. As finding what is unsaid in popular science journalism requires a reference sample, NS coverage is analyzed against the backdrop of institutional discourse, namely the official statement of the World Meteorological Organization (WMO, 2014). Taking inspiration from critical discourse analysis

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[1] This study analyzes a (less-researched) segment of climate communication, namely popularity-driven commercial science journalism targeting broad lay publics. It does not investigate scientific/academic or outreach discourse aimed at policy-makers (e.g. IPCC annual assessments) or its accommodation.

[2] Current statistics on NS readership and circulation that confirm its global reach and impact are available at https://www.newscientist.com/data/pdf/ns/mediacenter/us/us_mediakit.pdf.

(CDA), the study aims to grasp the patterns of representation used to obscure the knowledge that is not compatible with the "ideology of newsworthiness" (Bednarek & Caple, 2014) and reflect on the consequences this may have for personal and social mobilization.

2. Review of literature on climate change discourses in the context of mobilization

According to Beck's (2009) understanding of risk management, media outlets and social movements have the potential to provide knowledge and mobilize global communities to face risks. One order of discourse (Foucault, 2000) that is shaping how the risks of climate change are represented, normalized and responded to is science journalism. In this perspective, *discourse* refers to institutionalized patterns of knowledge filtering, management and reproduction that stem from underlying power relations, and are manifested in strategic textual choices. CDA of CCD journalism is thus oriented towards (1) uncovering pervasive, yet naturalized, strategies of (mis)representation, and (2) critically confronting their ideological underpinnings and consequences (Fairclough, 1995; Hansen & Machin, 2013). Climate coverage can foster responsibility and mobilize the public (Olausson, 2009), or deemphasize risks (Painter, 2013), stir controversy (Eubanks, 2015), and make the public complacent (Boykoff, 2011). Indeed, recent research on various orders of CCD concentrates on their capacity for mobilization.

Journalism scholars note that climate change reporting has a deficit of credibility, because it is often seen as advocacy (Nisbet, 2009), or because it foregrounds "connotations of catastrophe, danger and uncontrollability" that breed cynicism or fatalism (Russill & Nyssa, 2009, p. 324). To regain the "semblance of neutrality," editors employ compensatory textual strategies (Tong, 2015): the use of the label *climate change* rather than *global warming* results from the need to avoid bias. Yet exposure to the term *global warming* is more likely to enable mobilization, as, according to Whitmarsh (2009, p. 410), it produces associations with heat-related impacts caused by pollution, CFCs, fossil fuel consumption, or misuse of earth's resources that result in ozone depletion, ultraviolet light penetration and the trapping of greenhouse gases. By contrast, the term *climate change* is more readily associated with a range of impacts on climate/weather and agriculture/food supply that might have natural causes. In this light, the normalization of the label *climate change* in popular science may be regarded as a discursive strategy of knowledge management that forestalls mobilization.

The pressure to obtain a balanced coverage of climate science has introduced a disproportionate number of sources contesting climate change (Revkin, 2014). Mediated CCD, influenced by PR efforts of powerful energy lobbies (Hansen, 2011), foregrounds *uncertainties* in climate science whereas focusing on *risks* could help confront it (Painter, 2013). While uncertainty is a driving factor in scientific progress, the stress on what is *not* known in popular science generates doubt, diversion and complacency. To effectively mobilize the public, it is also important to use risk estimates that are *alarming* but manageable, not formulations that are *alarmist* or catastrophic, and to include local perspectives and culturally relevant explanations of solutions (Risbey, 2008). Yet, this recommendation does not match with newsworthiness-driven coverage that highlights uncertainty, controversy, and negativity to attract attention.

The uptake of CCD depends on its multiple remediations. Based on prior research, Rudiak-Gould (2014, p. 143) finds that public engagement with CCD should be correlated not only with the intensity of the exposure, or prior commitments to such ideological stances as conservatism, the belief in the just world, and in the legitimacy of the present social system (all predictors of climate skepticism), but also with morally grounded "trajectory narratives." The trajectory theory explains why societies that subscribe to the *decline* narrative, in which the world is seen as degenerating from a pristine state, will be ready to confront the risks of climate change and advocate stricter measures, while ones that believe in the *progress* narrative will be likely to dismiss the issue "by portraying it as only moderately dangerous" (Rudiak-Gould, 2014, p. 145). As a result, decline narratives without alarmist formulations seem optimized for mobilization.

Eubanks (2015) studies CCD in terms of an argumentative situation, and notes how the media-induced crisis of the authority of science (with its competing theories) leads to demobilization. This results from discursive strategies not oriented towards deliberation but towards confirming the initial positions through arguments reduced to: (1) binary oppositions borrowed from politics, economy and ethics, (2) references to prominent figures,[3] (3) metaphorical concepts and false analogies, (4) slogan-like news with attractive visualizations (pp. xi-xii). In popular journalism, another barrier is the use of simplifications of scientific and social intricacies of the climate issue (Revkin, 2014). One example is the editorial preference for the *mitigation* frame (a proposition that political consensus on carbon emissions solves the problem), rather than the *adaptation* frame (a proposition than all people are responsible for various decisions leading to reducing their carbon blueprint) (Olausson, 2009). Sensationalist framings in CCD that are meant to draw attention are not likely to be productive either, because they lead to confusion and social divisions (Jensen, 2012).

By now, CCDs have shaped a broad spectrum of perceived engagements and political positionings: from industrial fatalism and green Keynesianism, to eco-socialism and climate skepticism (Anshelm & Hultman, 2015). It is harder than ever to reconcile elite (scientific, institutional) and popular (mediated) discursive representations of global warming in order to catalyze action. Demobilization is also a side effect of the discrepancies between *global* and *local* CCDs. Jasanoff, for example, warns against "an impersonal, apolitical, and universal imaginary of climate change, projected and endorsed by science" taking over "from the subjective, situated and normative imaginations of human actors engaging directly with nature" (2010, p. 235). Prospects for mobilization lie in the reintegration of scientific and social responses to climate phenomena that will foster productive debates at the local levels.

The gap between scientific and popular CCDs is well-known from agenda-setting research (Moser & Dilling, 2010), which underscores the role of popular culture in the ranking of climate issue as a concern. At the individual level, it means that the degree of mobilization often depends on science literacy levels, political stances and cultural values, which coincides with active seeking of climate-related information (Leiserowitz et al., 2010). The more exposure people have to specialist discourses (rather than superficial reporting), the more engagement they show (Stamm, Clark, & Eblacas, 2000). However, even the most informative media coverage cannot rectify one's tendency to seek and remember information that supports existing beliefs, which explains resistance to explicit mobilization appeals (Happer & Philo, 2016). At the social level, the research on the "cultural circuits" of climate coverage explains why CCD periodically falls off media agendas (Carvalho & Burgess, 2005, p. 1462), a trend that tends to coincide with economic downturns. Also, the coverage's saturation with incongruous details and the lack of critical episodes to collect attention may have caused desensitization – a longer-term media-instigated "fatigue" with CCD (Nordhaus & Shellenberger, 2009).

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[3] See also Grundmann & Scott (2014) on the role of institutional endorsers and celebrity journalists.

Given the above, this study explores how making CCD more resonant with broader publics through newsworthiness-driven science journalism may inhibit mobilization. Notwithstanding the fact that popular science journalism is capable of closing the gap between science and society, democratizing the debate, and overcoming skepticism or confusion, I aim to identify the discourse strategies in NS's coverage that, in view of the above literature, background knowledge that could lead to mobilization.

3. Design of the study

Due to the focus on knowledge management in CCD, the method adopted here derives from language-oriented CDA (Hansen & Machin, 2013), which interrogates ideology-laden practices in journalism treated as a site where economic, social or political power inequalities are often reproduced as "regimes of truth." How the knowledge on climate change is managed is largely a matter of its regular "entextualizations" (van Dijk, 1998). The design of the study involves systematic coding and discourse analysis of linguistic resources that pertain to higher level concepts such as frames, narratives and news values and mapping their distribution and patterning.

Frames are said to guide readers' perception and interpretation of reality (Goffman, 1974), but media framings of one phenomenon may be fluid, especially if the issue is subjected to a large-scale public debate. For Entman (1993), frames constitute (competing) interpretative frameworks made up of factual and non-factual elements (ideas, judgments and evaluations) related to an issue. According to the literature reviewed above, some frames and narratives are more likely to mobilize diverse audiences. When exposed to CCD frames, non-expert readers are not only guided to accept a given understanding (decline, progress) and perception of science (certainty, controversy), but also led to envision a preferred solution (mitigation, adaptation). Although frames are notoriously difficult to operationalize in terms of specific linguistic resources, scholars often identify them on the basis of "evaluative elements" as well as "the taken-for-granted knowledge around a given topic" (Rojecki, 2005, p. 66). This study attends to both the emotive parameter of evaluation (alarming, alarmist) and the lexical choices that are used to (under)specify and (under)present details of phenomena, agency and institutional practices.

As CDA is committed to studying how textual resources are used to achieve ideological aims, it maps their strategic patterning in discourse, including the attention to "what is not there" (Wood & Kroger, 2000, pp. 91-93). As Fairclough (1995, p. 18) argues, CDA is a method that "encourages analysts to be sensitive to absences from the text – the choices that were not made but might have been – as well as presences in it, as well as to weigh presences against possible alternatives." Although linguists are generally aware of the obfuscating power of language, their analytic categories for the study of the absent reflect their disciplinary preoccupations. For example, conversation analysts study the role of silence in interaction; text linguists use the category of backgrounding (as opposed to foregrounding) through lexico-grammatical devices; cognitive linguists speak of hiding/highlighting potentials in the construal of mental images triggered by given linguistic structures; pragmaticians explore the roles and realizations of indirectness and implicature in speech and writing.

An interpretative CDA draws on these frameworks and follows abductive reasoning in examining patterned applications of various linguistic resources with a view to disclosing whether they are involved in making information hidden or limited, "which infringes on the rights of recipients to be adequately informed" (van Dijk, 2006, p. 366). Van Dijk (2006, p. 373) operationalizes this obfuscating function by pointing to discursive strategies at different levels of expression: (1) thematic – giving fewer details, being general, vague, implicit; (2) grammatical – hiding agency though nominalization, passive voice, impersonal constructions; (3) lexical – using euphemisms, metaphors/metonyms, understatements to obscure the nature of the referent; (4) compositional – defusing negative self-presentation (enabling positive self-presentation). In this study instances of repetitive applications of these discursive strategies will be illustrated.

An adequate grasp of discursive strategies of knowledge management also requires referring textual data to a larger context of text production practices. As popular science journalism is a profit-driven order of discourse, its products are constrained by editorial practices that reflect the strategic need to "sell science" (Nelkin, 1995). Bednarek and Caple (2014; 2017, p. 53-56) advocate a discursive approach to newsworthiness and document how such news values as consonance, eliteness (prominence), impact, negativity, personalization, positivity, proximity, superlativeness, timeliness and unexpectedness (novelty) are constructed through patterned uses of linguistic and visual resources in news reporting. In an earlier study, it was shown that science-related knowledge is constructed as relevant to audiences predominantly through novelty (unexpectedness) and superlativeness, timeliness and impact, negativity and positivity, and prominence (Molek-Kozakowska, 2017). These news values govern not only what is said, but also what is obscured, which has important implications for broader sense-making about climate change as an issue to confront through mobilization.

Due to the peculiar object of study (the unsaid), this analysis bases on a purposive sample of (con)textually coherent CCD (Schäfer et al., 2016). The design is somewhat similar to studies that explore "manipulative textual silences" resulting from ideological underpinnings of some types of opinionated political coverage (Huckin, 2002), but in this case a possible obfuscation is to be attributed to the ideology of newsworthiness that underlies popular science reporting. Unlike Olausson's (2009) CDA of thematic and stylistic realizations of climate-related frames in Swedish newspapers, this study attends to what is *not* made salient or prominent. The source is the Earth section of the online version of NS, an established international middle-market science popularization magazine. To downsize the sample to articles on climate-related issues that garnered wide readership, NS's "most-read" ranking was used because such texts, under certain conditions, could contribute to mobilization. Out of over 300 articles collected between October 2013 and December 2015, 30 are related to climate change (word count 22,600). They cover new studies of climate phenomena and current weather anomalies, carbon emissions-related issues, statistical models of future climate change, or impacts of climate change on animal species and societies. They also summarize IPCC reports, offer various predictions and warnings, include the political/moral aspects of the debate, and discuss technologies that could help slow down global warming.

To identify the aspects that were deemphasized in this sample, we used an institutional text, namely the World Meteorological Organization's "Statement on the status of the global climate in 2014" (report no 1152; word count 6800), which is a part of WMO's public outreach.[4] This report starts with the acknowledge-

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[4] WMO is a specialized agency of the UN based in Geneva, which since 1950s provides the authoritative voice on the state of Earth's atmosphere and water resources. It collects global weather/climate data, co-ordinates information from various countries, standardizes measures for controls and predicts and assesses climate trends. WMO is behind IPCC which received the 2007 Nobel Peace Prize. Its main outreach materials include atlases, bulletins and annual Statements on the State of the World's Climate (1993–2016). The Statement is taken as a point of reference because of its credibility, accessibility, currency and completeness, as a counterpoint to newsworthiness-driven coverage.

ment of its contributing institutions and summarizes the key research findings tracking climate change with respect to temperatures, rain/snow/ice, oceans, cyclones, greenhouse gases and ozone depleting substances. It provides a regional analysis of weather/climate measures and events in Africa, Asia, South America, North/Central America and the Caribbean, the South-west Pacific, and Europe. It concludes with an overview of major global weather events of 2014 and with a note on the methodology of event attribution, which simulates temperature distributions with and without the effect of human activities.

At the preparatory stage, NS texts were subjected to frequency and keyness analysis in WordSmith Tools 4.0 to explore any patterns of occurrence of CCD terminology (Grundmann & Scott, 2014) that could be used for further coding (see Appendix A). It emerged that geographical names related to Western audiences (*US* n = 33, *Australia* n = 21, *UK* n = 19) were high on keyness, and such collocations as *climate change, carbon dioxide/ emissions/ storage, greenhouse gas(es)/ emissions, ocean warming, renewable energy* were relatively common. High keyness of *likely* (n = 39) and *could* (n = 70) indicate the levels of uncertainty/controversy in the sample. At this stage, we also conducted a thorough coding and qualitative analysis of thematic, narrative and discursive features of the WMO's statement to produce a list of variables against which the NS sample could be compared (see column 1 in Table 2).

For the comparative analysis with WMO, the NS sample was annotated by 5 coders following a multiple-coding procedure for text-based datasets in Coding Analysis Toolkit. The code sheets included: (1) frames known from literature (uncertainty, threat, risk, responsibility, mitigation, adaptation, hope); (2) science-relevant news values (novelty, superlativeness, timeliness, impact, negativity/positivity, prominence) to be established for headlines and opening paragraphs,[5] which, according to Bednarek and Caple (2017, p. 198), are instrumental for one's further (engagement in) processing of the text; and (3) evaluation (progress/decline, alarming/alarmist) to be established for up to 3 closing paragraphs (codas), which mostly function to disambiguate the final judgments, reinforce memorization (the recency effect) and refer the reader to the present moment (temporary closure, possible mobilization).

In addition, the coders used tags to identify: themes (event/process, local/global), temporality patterns (past-oriented/future-oriented), voice/attribution (writer/researcher as narrator), argument (data/story), modality (certainty/controversy), register (spoken/written) on a paragraph-by-paragraph basis. The examples listed below feature instances of NS articles with intercoder reliability of at least 60% (3 out of 5), which amounted to 83% of the 306 paragraphs tagged.

4. Results and illustration

Table 1 lists sampled articles together with the results of the coding with respect to frame and news value basing on the heading and opening paragraph,[6] and the instantiations of trajectory narrative and its evaluation basing on the concluding paragraphs[7] (not always compatible).

As regards the most common framings of initial paragraphs, there is a tendency in NS to represent CCD issues in terms of threats (n = 7) and risks (n = 7), followed by the texts that use hope frames (n = 6) that strongly correlated with progress narratives, possibly to balance the negativity of the implications of the coverage. The negative framings were instigated by pejorative modifiers and emotive nominalizations, e.g., *huge climate shock* (NS1), *super-typhoon* (NS11), *drastic action* (NS25), *devastating floods* (NS29), as well as by marked verbal phrases, e.g., "intense snowstorms *dumped* (...) snow (...) *trapping* people in cars" (NS20). Even though many articles provide discrepant estimates of future climate change, few frame their presentation as excessively uncertain (n = 3) in the opening. Only 4 cases of responsibility frame were detected, while the frames most related to specific solutions (mitigation, n = 2; adaptation, n = 1) seem relatively rare. When the responsibility frame is invoked, it is usually about countries' or governments' failure to meet their pro-environmental targets. In two articles, NS2 and NS4, the responsibility is shifted to emerging economies that are urged to pursue more energy efficient technologies, even though they have not been primarily responsible for global warming.

As regards the construction of newsworthiness through common lexical choices that entextualize news values, it becomes evident that NS constructs news value by focusing on *the latest/ new/ recent* or *surprising* studies or estimates (timeliness/novelty, n = 11), privileging journalists' explanations of the scientific *significance* of the studies, and interpretations of scientific *applications/ uses* of reported outcomes (impact, n = 7). There is a tendency for extrapolating *worst*-case scenarios and focusing on anomalies (superlativeness, n = 3; negativity, n = 5). Explicit references to elite countries, research institutions and individuals (prominence, n = 3) build credibility of this version of CCD, but may hamper the critical reflection on implications of issues constructed in such a way.

In line with our argument, if some (combinations of) frames and news values are routinely constructed, alternative conceptualizations are removed, and this could have ideological implications. It might be observed that only one article's opening paragraph constructed proximity (NS7), and *scientific* impacts on monitoring climate change prevailed (see below for illustration) over people-directed solutions (only highlighted in NS2, NS19). Arguably, the latter formulations might be more conducive to mobilization, as, in accordance with Jasanoff (2010), they adopt a local, social and personal perspective on the issue within larger remote scientific and political debate.

In a similar vein, concluding paragraphs that reinforce a progress narrative (n = 12) constitute almost half of the articles that were able to be unequivocally coded for this feature (n = 27). Apart from the taken-for-granted preferences for energy efficient/renewable technologies, they highlight *better climate monitoring* (NS3), *efficient technologies* (NS4), *accurate global ocean data* (NS 15), *oil price volatility* (NS 21), or *deployment of carbon dioxide removal technologies* (NS22). According to Rudiak-Gould (2014), such reliance on scientific, managerial and technological advancements discourages people from reconsidering their lifestyle choices to reduce their individual carbon blueprint. Equally demobilizing are alarmist decline formulations (n = 10) that present climate deterioration as catastrophic in scope, thus largely as beyond any control of individuals.

Table 2 comprises the results of comparative discourse analysis; however, the oppositions presented below should not be regarded in absolute terms, but rather in terms of degree.

In the following sections I identify and interpret how the language of backgrounding tends to be applied in NS popularity-driven sample. I consider something as unsaid, following van Dijk (2006), when (1) it is only implied/presupposed through general or

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[5] For example, NS11: "Neoguri super-typhoon in Japan is El Niño harbinger. An *unusually early* Pacific super-typhoon with a wrinkle has led to *more than half a million people* in Japan being advised to *evacuate* their homes *this week*," was coded as "threat" frame and as "timeliness" news value on the basis of italicized words.

[6] If the frame was "threat" then a news value of "negativity" was excluded as a coding choice so as not to double the results and tease out more details.

[7] Alarmist/alarming evaluations refer only to "decline narratives" that envisioned severe/catastrophic deterioration of the environment (alarmist) or qualified risk estimates (alarming).

Table 1
Results of framing, newsworthiness, narrative and evaluation analysis. Own source.

		Frame	News value	Narrative
1	Puzzling moose deaths hint at climate shock to forests, 22 October 2013	Threat	Timeliness	Decline alarmist
2	Ethiopia switches on Africa's largest wind farm, 29 October 2013	Hope	Novelty	Progress
3	Earth's poles are shifting because of climate change, 13 December 2013	Hope	Impact	Progress
4	The seven deadly sinners driving global warming, 15 January 2014	Responsibility	Negativity	Progress
5	El Niño may make 2014 the hottest year on record, 10 February 2014	Uncertainty	Superlativeness	Decline alarming
6	How much hotter is the planet going to get?, 9 March 2014	Mitigation	Timeliness	Decline alarmist
7	How climate change will affect where you live, 31 March 2014	Adaptation	Proximity	
8	Antarctic wind vortex is strongest for 1000 years, 11 May 2014	Risk	Superlativeness	Decline, alarming
9	My dive into the blighted future of acidified oceans, 11 June 2014	Risk	Negativity	Decline alarmist
10	Huge 'whirlpools' in the ocean are driving the weather, 27 June 2014	Uncertainty	Superlativeness	Decline alarming
11	Neoguri super-typhoon in Japan is El Niño harbinger, 9 July 2014	Threat	Timeliness	Decline alarming
12	No more pause: Warming will be non-stop from now on, 31 August 2014	Mitigation	Negativity	Decline alarmist
13	World on track for worst-case warming scenario, 22 September 2014	Threat	Prominence	Decline alarmist
14	Crazy weather traced to Arctic's impact on jet stream, 26 September 2014	Risk	Impact	Decline alarmist
15	The world is warming faster than we thought, 5 October 2014	Responsibility	Novelty	Progress
16	Pentagon warns the US military of climate change, 14 October 2014	Threat	Prominence	Progress
17	Arctic melt means more severe winters likely – for now, 27 October 2014	Risk	Novelty	
18	A killer plague wouldn't save the planet from us, 29 October 2014	Threat	Impact	Decline alarmist
19	Snow retreat will worsen California droughts, 4 November 2014	Risk	Timeliness	Progress
20	What's behind the snowmageddon that hit the US?, 21 November 2014	Risk	Impact	
21	Over a barrel? Falling oil prices and the environment,13 January 2015	Hope	Novelty	Progress
22	Geoengineering would be 'irrational and irresponsible,' 11 February 2015	Responsibility	Impact	Progress
23	Coal bust may be behind stall in carbon emissions, 17 March 2015	Hope	Novelty	Progress
24	Carbon dioxide could be turned into a huge underground battery, 20 April 2015	Hope	Impact	progress
25	Latest numbers show at least 5 meters sea-level rise locked in, 10 June 2015	Threat	Timeliness	Decline alarmist
26	Earth now halfway to UN global warming limit, 29 July 2015	Risk	Negativity	Decline alarmist
27	14 ways the UK has backtracked on climate pledges this year, 7 October 2015	Responsibility	Negativity	Decline alarming
28	Pope's call for action on climate change has shifted US views, 11 November 2015	Hope	Timeliness	Progress
29	Climate change and La Niña may bring severe floods to Australia,16 November 2015	Threat	Impact	Decline alarming
30	Paris climate summit: Earth may warm by 6 °C – even with a deal, 2 December 2015	Uncertainty	Prominence	Decline alarmist

Table 2
Results of comparative analysis.

WMO	NS	% of articles (30)/% of paragraphs (3 0 6)	Exemplary NS articles
Theme: climate processes/phenomena (warming, ozone layer, ocean acidification, sea rise), global scope (equal attention to all continents and populations)	Specific events (weather anomalies) and locations (mostly Western), findings related to climate phenomena that explain current anomalies	60% of articles on specific events, 53% on specific locations	1, 4, 6, 7, 11, 14, 16 19, 20, 21, 23, 27, 29
Temporality: past-orientation: summary of long-term studies tracing temperature increases since the 1950 s	Future-orientation: projection of upcoming developments, estimates, expectations shaped by reported findings	66% future-oriented articles, (26% past/present-oriented)	1, 3, 5, 6, 7, 9, 11, 12, 16, 17, 18, 19, 22, 24, 26, 29
Voice/attribution: institutional collective authorship of observations and conclusions (note on agencies collaborating within WMO)	Judgments/conclusions reached by reporters on the basis of releases of reports/studies and information attributed to individual scholars representing specific research centers	20% of articles based on a specific study explained by an interviewed researcher, (80% of material retold/ synthesized by reporter)	1, 13, 14, 22, 24, 29
Evaluation: alarming (hierarchy of major problems, exigency of carbon emissions cuts and social adaptation)	Alarmist statements sometimes followed by conditionals and qualifications	63% of decline articles forward an alarmist evaluation	1, 6, 9, 12, 13, 14, 18, 25, 26, 30
Argument: hard data and results, scientific reasoning, authoritativeness of sources	Story-driven argumentation with examples and analogies, data-driven paragraphs with factual information	50% of story-based articles; (21% of paragraphs feature factual data)	9, 10, 11, 14, 16, 17, 18, 19, 20, 21, 23, 25, 26, 27, 29
Modality: relatively uncontroversial, direct presentation (scientific exposition, rigor, conclusive outcomes)	Incongruence between various studies, speculation, foregrounding of counterintuitive details	50% of controversy- driven articles	1, 4, 5, 6, 10, 11, 12, 16, 21, 23, 24, 25
Register: formal, written (without excessive jargon)	Casual, spoken (with some jargon to boost credibility), evaluative, emotional	27% of paragraphs with spoken language (direct speech)	6, 7, 11, 12, 13, 20, 30

vague formulations; (2) it is grammatically obscured through passive, nominal or impersonal constructions; (3) it is lexically deemphasized through euphemism, metaphor or underspecification; (4) it is compositionally made less available to readers.

Vague expressions do not spell out the details of agents, actions or circumstances (e.g., numbers, locations, responsibility) and increase newsworthiness without overburdening or alienating the readers. The following example illustrates this:

> Moose in the northern US are dying in what could be the start of a *huge climate shock* to the world's boreal forests (…) *Heat stress* may also weaken their immune systems and make them more susceptible to parasites. (…) Researchers have yet to prove a link to climate change. But (…) lynx and snowshoe hares are also *declining* in the southern parts of their ranges, reinforcing the idea that *climate change is to blame*. (NS1)

Such expressions as *climate shock* and *heat stress* introduce drama through pejorative abstractions, the word *declining* is a euphemism for dying, and the impersonal construction *climate change is to blame* removes human complicity.[8]

Other examples of blame attribution to non-human entities include "climate change may be to blame for more frequent prolonged spells of extreme weather in Europe, Asia and North America" (NS14) and "[Researchers] wanted to know how much of the blame [for flooding can be] laid with that year's La Niña – and how much was caused by longer-term ocean warming" (NS29, cf. NS3). The obfuscation of human responsibility[9] yields such expressions as "As a result of climate change 2014 is likely to be one of the hottest years on record" (NS5), which borders on tautology.

Certain types of uncomfortable climate change knowledge are presupposed rather than articulated. If an idea is presented in the form of presupposition, this may lead to its uncritical acceptance, since ideas are harder to challenge when presented indirectly. For example, the presupposition that carbon-neutrality is something that *all* countries should strive for is the common ground for the enthusiastic coverage of Ethiopia's wind farm:

> [Ethiopia's] *goal* of being carbon–neutral by 2025 starts to look *plausible.* (NS2)

The hope frame obscures the fact that Ethiopians are not in a position to appreciate this *goal*, as 77% still do not have access to electricity (as is admitted only later in the article, a case of obfuscatory *compositional* device). Although Ethiopia, unlike Western countries, is minimally responsible for climate change, it is taken for granted that it is obliged to control its carbon emissions.

Presuppositions also include common framings of climate science, particularly with hopes it will "handle the crisis," in articles where climate change consequences are re-presented in terms of science's "new opportunities":

> Climate change is causing the North Pole's location to drift, owing to *subtle changes* in Earth's rotation that result from *the melting of glaciers and ice sheets*. The finding suggests that monitoring the position of the pole could become *a new tool* for tracking global warming. (NS3)

This article considers a noticeable shift in the location of Earth's poles as a *subtle* anomaly, or a curious scientific fact. The nominal phrase *the melting of glaciers and ice sheets* induces the perception

of it as if it was a natural process. The foregrounding of this finding's application for climate modelling hides the dramatic consequences of icecap meltdown (sea-level rise), which is left as part of the taken-for-granted unwelcome knowledge. The focus on climate modelling orients the readers towards a *scientific* solution – closer monitoring of global warming – rather than towards the *social* solution and individual mobilization. A similar pattern can be found in NS5: "But now a model aimed specifically at predicting El Niño…"; NS6: "difference between models and observations is probably due to increased heat uptake by the oceans", NS8: "team simulated the last millennium using eight climate models"; NS13: "Models predict how much the world will warm" (cf. NS15, 17, 18, 19, 24, 29, 30).

The lexical pattern that foregrounds "surprising" findings and allows one to speculate about possible scenarios of climate change is a known strategy in popular science writing to garner attention.

> This may seem *surprising* given that the slower warming in the past decade has led some to conclude that the sensitivity of the climate is low. But *the latest findings* show that the cooling effect of aerosol pollution from factories and fires has been *underestimated*. This means warming will resume with a vengeance if countries in Asia clean up their skies. (NS6)

This type of reasoning, besides construing a threat, works to restore the equilibrium between what is known and what is uncertain, and reconstitutes readers' trust in science. The progress narrative is invoked with the implication that scientists will offer ever better models of how much of a greenhouse effect can be expected; yet the text stops short of transposing it to the personal domain of commitment. Alternatively, to enhance newsworthiness reporters may cast slight doubt on the accuracy of previous studies/others' estimates (often introduced with "but now" or "but not everyone agrees" cf. NS3, 5, 6, 13, 17, 18, 21). Even though the lack of consensus is key to scientific progress, fostering uncertainty and preoccupation with controversy are not productive problem formulations that could lead to social mobilization (Jensen, 2012; Painter, 2013).

Grammatical backgrounding is realized through embedded clauses, impersonal structures, nominalization or passivization, which may be used to obscure agency, responsibility or unequal power relations. In a formulation "CO_2 emissions must fall by 2.5 percent a year to meet that target" (NS23), it is not specified who is to make this happen. The gerund form *curbing* in "the best way to combat climate change is the simplest: curbing CO_2 emissions" (NS22) is both disentangled from the agent and a metaphor that has positive connotations of control (unlike the verb *cut*).[10] Even the stronger "we need to cut emissions fast if we are to avoid dangerous climate change" (NS6) underspecifies *we* and mitigates the claim with the conditional *if we are to.*

Unlike in the WMO statement, here individual researchers are credited with specific climate predictions. These claims may not be endorsed institutionally, but readers are positioned to accept them due to strategic vagueness (and comforting tones):

> Le Quéré says it is still *possible* to stay below the internationally agreed target of 2 °C, but that this will require drastic emissions cuts *across the world*, and *very soon*. Bringing *certain technologies* online – such as carbon capture and storage – would be instrumental in achieving this. (NS13)

Responsibility is dispersed here, just as the attribution of blame for the effects of climate change was structurally suppressed in earlier examples. This can also be achieved through compositional

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[8] This is also an example of causal simplification. Some researchers note that environmental news items lack intricate causal explanations of processes, as these might be too complex to report despite their relevance to audiences (Bednarek & Caple, 2017: 73).

[9] The phrase "anthropogenic climate change" occurs only once.

[10] *Curb* emissions is used 7 times in the sample while *cut* prevails with 17 instances.

maneuvering in narrative sequences, or evoked by the arrangement of arguments and examples. Below, NS touts the ranking of the biggest polluters (criminalized as *offenders*):

> It's a chart that no one wants to top, but global warming's *worst offenders*, in absolute terms, are the *US, China, Russia, Brazil, India, Germany and the UK*. New calculations suggest that these nations are responsible for more than 60 per cent of the global warming between 1906 and 2005. (NS4)

Only towards the end of the article does one learn about a different, *fairer* ranking: according to climate contribution by population, "*the top* seven positions are held by *richer nations*, and China and India drop to 19 th and 20 th, respectively" (NS4). Making the fairer ranking less accessible and specific (which 7 richer nations?) enables NS to avoid unduly making some target readers feel uncomfortable by being indirectly called *offenders* or *sinners* (as in the headline). NS4's preoccupation with mapping and statistics on carbon emissions also displaces the adaptation frame.

Due to its composition, "How climate change will affect where you live" (NS7), which covers the latest IPCC estimates for different parts of the world, may be seen as another instance of strategic reordering in article composition. The first section (Europe: The south will fry) discusses possible heatwaves in Europe, while the last one predicts the demise of some Pacific islands (Small islands: Sinking and eroding). Predictably, it is more relevant for Western readers (proximity value) to know that "The Mediterranean looks to be *the most threatened* part of Europe" due to "multiple stresses and systemic failures" than that "in the Indian and Pacific oceans, rising waters will swamp some areas, erode coasts and contaminate sources of fresh water." Even though the word *threatened* might better describe the latter case, it is used here to imply that Europe bears the brunt of climate change (and to trivialize others' situation).

Also, the syntax of spoken register and the use of emphatic modifiers ("The south will *fry*") can both be seen as devices that discursively reconfigure power relations: towards the perception of solidarity in a predicament and away from the unequal distribution of responsibility for climate change.

Strategic compositional obfuscation can also be detected in NS18, which touches upon one of the unmentionable topics – overpopulation – but clearly indicates that tackling this is a non-option.

> It's getting overcrowded here on Earth. More than 7 billion people are *taking their toll on the planet,* and the number is rising. What would it take to defuse this population time bomb? Drastic times could, in theory, call for drastic measures. But according to a new study, not even a global one-child policy *would make much difference*, and neither would a killer plague. (NS18)

With the acerbic tone, the moral and ideological aspects of what is labelled colloquially as "[people] taking their toll on the planet" are hidden behind demographers' models, with the notions of qualitative change in lifestyles and social adaptation vaguely intimated in the last paragraph: "human behaviour is more important than human numbers." Arguing what would be a "*sustainable* population," as a technology for climate change management, is used as a proxy to direct attention away from viable social solutions.

5. Conclusion

This study explores a purposive sample of NS's climate change coverage in order to shed light on discursive strategies of obfuscating information that could otherwise be conducive to mobilization. To make the coverage newsworthy despite the negativity inherent in the topic, the outlet manages climate change knowledge by strategically backgrounding some alienating information. Instead, it constructs climate *science* as novel, timely and impactful for readers to celebrate and to overcome the sense of fatigue with environmental coverage. While it uses some negative frames for CCD (threat, risk), it balances them with hope and trust in scientific solutions, sometimes representing the crisis as a possibility for new technologies to emerge. In this way NS most-read coverage endorses the so-called progress narrative that displaces mobilization, as it puts all trust in institutional agents (Rudiak-Gould, 2014). Such popularization discourse may indeed resonate with consumers by oscillating between well-known negative frames of threat and the hegemonic narratives of scientific progress capable of mitigating it (Eubanks, 2015).

A conspicuously lacking element in this material is a critical reflection on how science is done and promoted (Bucchi, 1998). NS's representations of CCD are consistent with current scientific consensus, but seem to foreground unduly the evolutionary (and sometimes controversial) nature of *doing science*. Many articles in the sample focus on the advancements in modelling climate change and on issuing ever more alarmist warnings without pointing desirable policy directions and articulating concrete social implications. It is not to claim that NS's primary function is to mobilize; however, information provision that foregoes this function in a critical situation would be considered irresponsible. Indeed, NS seems to shape CCD on the basis of what engages target audiences the most and what alienates them the least (Fahnestock, 1986). Through impersonal structures, strategic formulations that obscure causality and responsibility and compositional maneuvering in narrative sequences, it implies that personal action need not necessarily be taken, as science and technologies can or should take care of global warming.

One may argue that the backgrounding of more uncomfortable knowledge of climate change is a result of NS's being a commercial outlet that aims to "sell science" and attract and cultivate loyal readers (Nelkin, 1995; Bednarek & Caple, 2017). This study confirms that the most popular reports are indeed discursively organized to resonate with Western audiences and manage their knowledge schemas through recurrent (but not necessarily mobilizing) framings of the CCD (Risbey, 2008). The inspection of the linguistic layer of the coverage reveals that vague and implicit statements, structural suppression and compositional reordering might be used to disperse individual responsibility and project a sense of international solidarity in a risk-laden situation (Beck, 2009). However, this representation can obscure the fundamentally unequal relations between the developed and the developing countries that struggle the most with the consequences of climate change. Indeed, certain controversial items (excessive consumption, overpopulation) are so rarely thematized (n = 1) in the sample that they might constitute what Huckin (2002) calls "textual silences."[11]

The small-scale, qualitative design of this study has been chosen to focus on subtle, yet strategic, linguistic characteristics of CCD in popularity-driven journalism. The comparative perspective has revealed what is missing from the outlet's discursive constructions of climate change. This, however, cannot be generalized to evaluate journalistic textual practices of other popularizers. Despite its grounding in theoretical frameworks and previous research and a triangulated analytic procedure, the

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[11] This can be linked to critical studies that see popular media as a tool for invisibilizing neoliberal ideologies by giving undue visibility to scientific or environmental projects that do not appear to be related to capitalist interests (Cammaerts, 2015).

study is overlaid with CDA researcher subjectivity regarding "what is not there, but might have been" (Fairclough, 1995, p. 18). A larger and more diverse sample needs to be collected and a more exhaustive coding procedure needs to be applied to further quantify and confirm the relation between typical discursive strategies of science popularization and (de)mobilization of specific target audiences.

Although NS seems to have done much to foster awareness of the climate change consensus and alarming the public, and the craft and diversity of its reporting should not be diminished, its popularity with audiences might have some unfortunate side effects. Resonance does not translate into mobilization if the entextualized representations of climate science champion progress narratives that preclude individual agency and depoliticize audiences (cf. Pepermans & Maeseele, 2014). Media might be capable of shouldering the mission of broadening the public understanding of climate science and enabling mobilization (Olausson, 2009); however, their commercial interests and political agendas should be interrogated critically. Studying what might be missing from popular coverage of global warming, and how language is recruited for the purpose of eliminating some information, could shed more light on how to more effectively confront the climate change challenge at a critical moment.

Appendix A

N	Keywords	Frequency <20 baseline	%	Ref. BNC frequency	%	Keyness <40 (+) baseline
1.	CLIMATE	130	0.7265	2782		1181.5
2.	WARMING	96	0.5365	1088		990.23
3.	NIÑO	25	0.1397	0		431.2
4.	SAYS	113	0.6315	39363	0.0396	414.52
5.	GLOBAL	54	0.3018	3527		372.57
6.	EMISSIONS	44	0.2459	1450		36259
7.	CARBON	39	0.218	2465		271.56
8.	CHANGE	74	0.4136	31544	0.0317	243.54
9.	SENSITIVITY	30	0.1677	1568		220.06
10.	ARCTIC	24	0.1341	862		193.7
11.	ENERGY	44	0.2459	12098	0.0122	180.88
12.	C	60	0.3353	31384	0.0316	174.98
13.	WEATHER	34	0.19	5572		173.5
14.	TEMPERATURES	24	0.1341	1441		169.51
15.	WINDS	24	0.1341	1617		164.09
16.	EXTREME	28	0.1565	3623		155.72
17.	COAL	30	0.1677	4998		152.13
18.	OCEAN	23	0.1285	1967		146.5
19.	HEAT	30	0.1677	5794		143.57
20.	ICE	27	0.1509	3981		143.3
21.	MODELS	28	0.1565	5250		135.6
22.	OIL	32	0.1788	10158	0.0102	122.84
23.	TEMPERATURE	23	0.1285	4343		111.06
24.	BILLION	22	0.123	4739		100.66
25.	EARTH	26	0.1453	8402		98.926
26.	WATER	42	0.2347	34134	0.0343	89.828
27.	AUSTRALIA	20	0.1118	4590		89.082
28.	WORLD	49	0.2739	53806	0.0541	80.356
29.	UK	29	0.1621	16534	0.0166	80.028
30.	SEA	26	0.1453	12600	0.0127	79.39
31.	WILL	116	0.6483	251179	0.2525	77.367
32.	MORE	103	0.5756	209705	0.2108	76.579
33.	UNIVERSITY	27	0.1509	15780	0.0159	73.308
34.	RISE	23	0.1285	10455	0.0105	72.919
35.	LIKELY	31	0.1733	23000	0.0231	71.145
36.	YEAR	52	0.2906	68714	0.0691	70.203
37.	LOW	24	0.1341	16735	0.0168	57.665
38.	AIR	24	0.1341	18415	0.0185	53.68
39.	COULD	70	0.3912	143691	0.1445	51.265
40.	POWER	29	0.1621	31627	0.0318	47.856
41.	IS	270	1.509	974293	0.9795	44.372

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